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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/817,623	04/05/2004	Toru Takeda	251272US2S RE	2816
22850	7590	07/10/2008		
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER FULK, STEVEN J	
			ART UNIT	PAPER NUMBER
			2891	
			NOTIFICATION DATE	DELIVERY MODE
			07/10/2008	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/817,623	<b>Applicant(s)</b> TAKEDA ET AL.	
	<b>Examiner</b> STEVEN J. FULK	<b>Art Unit</b> 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 March 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 and 33-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1, 14, 16-18 and 33 is/are allowed.
- 6) ☒ Claim(s) 2-13 and 34-37 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☒ Certified copies of the priority documents have been received in Application No. 09/604,100.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. The finality of the Office Action mailed October 10, 2007 is withdrawn in order to present a new rejection of the claims submitted on September 17, 2007 under 35 U.S.C. 251 as being broadened in a reissue application filed outside the two year statutory period, per the rejection below.
2. The Reissue Declaration filed March 7, 2008, which pertains to the new limitations added to claims 1, 2 and 12 in the amendment filed September 17, 2007, has been accepted.

### ***Claim Objections***

3. Claim 15 is objected to because of the following informalities: the status of claim 15 is listed as "Amended", however there does not appear to be any amendment made to the claim. The Examiner believes the status should be listed as "Original".  
Appropriate correction is required.

### ***Reissue Applications***

4. Applicant is reminded of the continuing obligation under 37 CFR 1.178(b), to timely apprise the Office of any prior or concurrent proceeding in which Patent No. 6,346,464 is or was involved. These proceedings would include interferences, reissues, reexaminations, and litigation.

Applicant is further reminded of the continuing obligation under 37 CFR 1.56, to timely apprise the Office of any information which is material to patentability of the claims under consideration in this reissue application.

These obligations rest with each individual associated with the filing and prosecution of this application for reissue. See also MPEP §§ 1404, 1442.01 and 1442.04.

5. Claims 2-13 and 34-37 are rejected under 35 U.S.C. 251 as being broadened in a reissue application filed outside the two year statutory period. Claims 2 and 12 have been amended to recite "the cross-sectional shape and cross-section area...*are formed* along the direction of irradiation", whereas the original claims recited "the cross-sectional shape and cross-section area...*may be uniform* along the direction of irradiation" (emphasis added). While the original claim language was unclear as to whether the shape and area were uniform (may be or may not be), the amendment removes any reference to being uniform. A claim is broader in scope than the original claims if it contains within its scope any conceivable product or process which would not have infringed the original patent. A claim is broadened if it is broader in any one respect even though it may be narrower in other respects.

6. The broadening rejection can be overcome by amending claim 2 and 12 with respect to the original claim language to recite " the cross-sectional shape and cross-section area...[may be] are uniform along the direction of irradiation". This amendment to claims 2 and 12 would then require the cancellation of claims 34 and 36, which recite the same limitations as the proposed amendment. A clean set of claims that are amended with respect to the original patented claim language (i.e., bracketing all limitations to be deleted from the original patented claims and underlining all limitations

to be added to the original patented claims) should be submitted with the next response from Applicant.

Upon making the proposed amendment to claims 2 and 12, **a supplemental reissue oath/declaration under 37 CFR 1.175(b)(1) must be received** before this reissue application can be allowed. An example of acceptable language to be used in the supplemental oath/declaration is as follows:

"Every error in the patent which was corrected in the present reissue application, and is not covered by a prior oath/declaration submitted in this application, arose without any deceptive intention on the part of the applicant."

See MPEP § 1414.01.

***Allowable Subject Matter***

7. Claims 1, 14, 16-18 and 33 are allowed. Claim 15 would be allowable if the objection set forth in paragraph 3 above is overcome.

8. The following is an examiner's statement of reasons for allowance: a search of the prior art failed to disclose or reasonably suggest a semiconductor device manufacturing method of forming a second conductivity-type region by irradiating impurity ions onto semiconductor substrate; wherein the irradiating impurity ions is performed to form a junction structure comprising a vertical junction group where a first conductivity-type region and the second conductivity-type region are alternatively arranged vertically to a surface of the semiconductor substrate; and wherein the impurity ion irradiated region is restricted by a shield mask intercepting the impurity ions and the impurity ion acceleration energy is controlled to provide a uniform impurity distribution in the direction of irradiation in the second conductivity-type region, as recited by independent claim 1.

A search of the prior art also failed to disclose or reasonably suggest a semiconductor device manufacturing method of forming an N<sup>+</sup> region by irradiating a neutron beam onto a semiconductor ingot having a P<sup>+</sup> region; wherein the incident direction of the neutron beam is collimated to make the cross-sectional shape and the cross-section area of the N<sup>+</sup> region on planes perpendicular to the direction of irradiation uniform along the direction of irradiation, and the impurity distribution in the N<sup>+</sup> region is controlled to be uniform along the direction of irradiation, as recited by independent claim 14.

Komori '882 teaches a semiconductor device manufacturing method of forming a second conductivity-type region by irradiating impurity ions onto semiconductor substrate, but the reference does not teach the irradiating impurity ions to be performed to form a junction structure comprising a vertical junction group where a first conductivity-type region and the second conductivity-type region are alternatively arranged vertically to a surface of the semiconductor substrate; nor does the reference teach forming an N<sup>+</sup> region by irradiating a neutron beam onto a semiconductor ingot having a P<sup>+</sup> region.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEVEN J. FULK whose telephone number is (571)272-8323. The examiner can normally be reached on Monday through Friday, 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on (571) 272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

10. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Steven J. Fulk  
Patent Examiner  
Art Unit 2891

June 26, 2008

/BRADLEY W BAUMEISTER/  
Supervisory Patent Examiner, Art Unit 2891